

## ‘More of an Art than a Science’:

### Supporting the Creation of Playlists and Mixes

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#### Abstract

This paper presents an analysis of how people construct playlists and mixes. Interviews with practitioners and postings made to a web site are analyzed using a grounded theory approach to extract themes and categorizations. The information sought is often encapsulated as music information retrieval tasks, albeit not as the traditional “known item search” paradigm. The collated data is analyzed and trends identified and discussed in relation to music information retrieval algorithms that could help support such activity.

**Keywords:** playlists, mix CD, music information behavior.

#### 1. Introduction

*I'm trying to put together a mix where one song responds to another song. The first example that comes to mind is Neil Young's "Southern Man," to which Lynyrd Skynyrd replied with "Sweet Home Alabama."*

This is a real-world music information retrieval task, taken from a posting to the Art of the Mix web site, a site dedicated to playlists and mixes. Other examples from the site mention as motivations for playlist creation an event such as a wedding, a mood they want to create, or a particular beat-rate for the gym.

Queries like these do not conform to the “known item search” paradigm which has seen extensive research in the music information retrieval community over the past few years, but rather taps into more lateral notions of association. What motivates such requests? Are there any established rules for forming mixes and playlists? Can existing MIR algorithms augment existing software tools to help people satisfy such queries?

In this paper we consider these and related issues. We start by describing the data that was gathered for analysis. Several sources were used: face to face and web interviews

with people who regularly create playlists, discussion threads about playlists, and as postings seeking help with mixes. While conversationally the terms playlist and mix are often used interchangeably, here we are more careful in distinguishing between them. A mix is usually of a set length, enough music to fill a CD or (less commonly these days) a tape, usually has a strongly defined theme, and the order of the songs can be significant. It is often a gift for someone else. Playlists, in comparison, are typically for personal use, have varying lengths and a less strictly defined theme. In Section 3 we highlight identifiable patterns to playlist generation that emerged from our collated data (primarily the interviews). In Section 4 we study postings about formal mixes and categorize the set of organizing principles that are often the motivation for a mix. We conclude with a discussion of how, based on our findings, software features and music processing techniques such as those already developed for MIR can assist people in creating playlists and mixes.

#### 2. Data Gathering

Data was collected on how individuals create playlists or mix CDs, the organizing principles behind the lists, the factors that make a given list ‘good’ or ‘bad’, and the purposes for which lists are created. Specifically, we conducted six face-to-face interviews, and seven web-based interviews. We also collected six ‘threads’ (a total of 24 postings) exploring those questions from The Art of the Mix website ([www.artofthemix.org](http://www.artofthemix.org)). In the discussion below, interview participants are identified by a letter of the alphabet (Participant A, B, etc.), and contributors to the ‘threads’ are identified by their Art of the Mix usernames (e.g., bazoomy).

Art of the Mix is dedicated to mix tapes and CDs. It includes an extensive database of tens of thousands of playlists (text lists of song titles and artists) submitted by mix aficionados worldwide, and also includes forums and blogs that serve as a community center for discussion of playlist and mix creation. A set of 29,000 playlists from the Art of the Mix database have been used in earlier music retrieval studies to construct a graph of artist relationships, based on artist co-occurrence in playlists ([3], [4], [11]).

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In this study, we also analyze 115 requests posted to the Art of the Mix Forums, requesting help in completing a mix. These requests are essentially music information queries, with the goal of the information request being an ordered set of songs that conform to the organizing principles of the mix.

We analyzed these interviews and playlist/mix construction help requests using a grounded theory approach [7]. With this technique researchers attempt to approach the data without prior assumptions, and to generate theory from the data.

### 3. Personal Use Playlists

Some playlists are created for personal use by oneself or a few close friends—primarily as background for another activity, for example to listen to while traveling, studying, or exercising at the gym. A playlist may be created to reflect a particular mood or emotion in the creator, such as depression, angst, or cheerfulness (“They reflect how I’m feeling at the time, they reinforce how I’m feeling”; Participant C). A playlist might also be shared as ‘party music’, in this context mainly as background rather than as dance music or the center of focus for the party.

The length of a playlist should match the length of its associated activity. If the activity is brief or isn’t repeated, then it hardly seems worth the effort to create a special playlist, rather than just putting existing ‘Favorites’ on shuffle. The longest personal use playlist reported by a participant was eight hours of ‘thesis proposal writing songs’:

It’s called Plan, it was made for writing my research plan for my PhD. I did not enjoy that process. One of the things I did to make it easier was to select 8 hours of music I liked well enough that it wouldn’t be annoying, so I could just leave it playing 8 hours and not have to mess around with my music. [Participant B]

Personal playlists can be re-used: for example, songs to listen to while walking can also keep one awake while driving, a playlist for one long plane journey can be useful for the next trip, and ‘study music’ serves as background for more than one subject or assignment. Participants reported being more likely to invest effort into creating a playlist that they felt would be used several times.

Because these lists are listened to on more than one occasion, or perhaps repeated during extra-long journey, participants report that they usually set these playlists on shuffle; this keeps the playlist fresh. If the songs all conform to the organizing style or theme of the playlist then they are more or less compatible with each other, and there is little risk of an abrasive transition between songs (“so it’s not a big shock going from punk to world music or something”; Participant A). Indeed, the serendipitous juxtaposition of songs may inspire new insights into the songs or spark an idea for a new playlists.

Three interview participants did see a need for being able to sequence certain songs in a given playlist—a ‘chain’ of two or perhaps three songs that they felt should be played in a certain order. For example, “if there are two parts to that song, like with *We Will Rock You* by Queen, the second half of that song is *We Are the Champions*. I usually play those in that order” (Participant E). Popular mp3 players do not as yet support the idea of ordered sequences within a shuffle.

## 4. Formal Mixes

This section discusses types of formal mixes, and issues in their creation.

### 4.1 Organizing Principles for Mixes

A good mix has a central theme or organizing principle: it tells a story, shares a mood, “gives a perspective into the individual songs that you wouldn’t have had without seeing them in that idea” (Interview B). Table 1 presents a categorization of the organizing principles for 115 mix help requests posted to the Art of the Mix Forums; these categories emerged from a grounded theory analysis of the requests [7], and the assignment of a request to a category was confirmed by discussion among the researchers. As many proposed mixes had more than one theme, the percentages total to more than 100%.

**Table 1. Categorization of Organizing Principles for Mix Help Requests**

Category	No. (%)
Artist/Genre/Style	29 (25.2%)
Event or Activity (further breakdown in Table 2)	29 (25.2%)
Romance	22 (19.1%)
Message or Story	19 (16.5%)
Mood	19 (16.5%)
Challenge or Puzzle	12 (10.4%)
Orchestration	8 (7%)
Characteristics of Mix Recipient	7 (6.1%)
Cultural References	7 (6.1%)
Other	3 (2.6%)

One quarter of mixes focused on specific *Artists*, *Genres*, or *Styles*—for example, “Best of Prince”, “acoustic-country-folk type stuff”, “Hawaiian music”. Genre and style categories are notoriously difficult to define [13], and the mix help requests frequently desire songs that straddle one or more genres and styles (“acoustic-country-folk”, “kinda Psychedelic/British Invasion/Mod”). On the other hand, if the goal is to support browsing then a lack of crisp categories may not be problematic. Browsing structures could help the user to narrow down the choices to a reasonably sized set of candidates if combined with display facilities that support the user in efficiently scanning that set.

Relationships can be complicated. The *Romance* category includes conventional love themes (for example, for a mix as a gift for a “little sister just...married to the man of her dreams”, who wants a “romantic masterpiece”; “great love songs”). Other requests are less straightforward: a mix to mark ‘the end of the affair’ (“...that expresses dissapointment [sic] and longing...kind of like my farewell... but I don’t want the entire thing to be unlistenably depressing. I also don’t want all of them to do with obsessive love, ’cause I would hate to leave this man thinking I’m going to pull a “Fatal Attraction” on him”); a mix with the title ““quit being a douche’, ’cause I’m in love with you. The title is somewhat self explanatory [sic]”; expressing bitterness towards a former lover (“Yeah, so I just got my heart broken. Any break up song that has a sad/angry vibe.”).

Some mixes are intended to be listened to, as part of an *Event* or *Activity* (Table 2). Travel mixes are mainly intended as gifts for a friend or lover who is making a significant journey. Mixes often celebrate holidays in idiosyncratic ways (“anti-Valentine mix”; “a very homosexual holiday mix”); mixes can set the vibe for a party (“creepy songs”) and may also be given as gifts to attendees; and assorted other activities (working out at the gym, enjoying “sparkling afternoons”).

We distinguish (perhaps arbitrarily) between mixes that are listened to as background music for an *Event* or *Activity*, and those that are constructed to tell a *Story* by describing an experience (real or imaginary, past or future) in music: for example, the planned activities for an upcoming bachelor party (“gambling, golf, a trip to the ballet, some drinking, a tailgate party and an NFL game”). A mix can also be intended to send a *Message* to the recipient (a “mix for a cute stalker” that sends the message, “Yeah, I see you checking me out”). Messages can be ambiguous:

There was a situation where I was getting to know this guy. We both gave each other playlists, it was bad because a lot of songs are about love and relationships, you just didn’t know [how the other person was interpreting the mix]. [Participant P, interviews]

A range of *Moods* were specified: for example, “feel good happy”, “mellow”, “aggressive, violent or angry”. Some mood descriptions are more complex and difficult to capture in words (or song): “ever just sit alone in the dark while it’s raining out - you feel kind of lonely and sad, but it’s that sweet, sensual sort of sorrow that just feels good and, in a way, comforting?”

With a *Challenge* or *Puzzle* mix, the goal is to create an acceptably listenable mix that meets artificial criteria: for example, a mix of songs with “eye” in the title, or more elaborately, a Frankenstein mix of songs conforming to rules such as: a song by an artist from, or somehow relating to where you live; a cover you like more than the original; a one hit wonder; the last song you downloaded; a

song whose title is a question?; and so forth. These mixes allow the creator to show off their deep knowledge of music, explore and display their own collection and musical tastes (sometimes a fraught process, if the collection includes songs that might destroy one’s hip credibility), and offer the enjoyment and mental stimulation of a crossword puzzle or other mental game.

The *Orchestration* category was construed broadly, to include instrumentation (“songs that feature cello...preferably solo”) and other sound-related facets of the performance (“songs where the singer humms for a little bit”).

Seven mix help requests focused on *Characteristics of the Mix Recipient* as defining the types of songs required to complete a mix for that person: for example, songs for “my mom...She’s tiny, ... 100 lbs about, harley chick, fun with broad music tastes.” These descriptions tap into stereotypes or profiles of the sorts of music that people of a particular age group, sexual orientation, personality, subculture, etc. might be expected to enjoy.

*Cultural References* are a mixed bag: for example, “songs about superheroes”, “Viva Las Vegas”, “40 oz malt liquor”. Other requests fall outside any of the categories: for example, a mix “devoted ENTIRELY to listening pleasure”.

**Table 2. Events and Activities**

Category	No.
Party	8
Travel	6
Holiday	5
Other	8

## 4.2 Additional Descriptive Features

Tempo is mentioned as a secondary criteria for three mix requests: songs that are approximately 140 beats per minute (for exercising in a gym), songs that are not “terribly sloooww”, and songs to appropriately pace various segments of a 5½ hour dance party.

Eleven queries (9.6%) referenced the preferred date of first release for a candidate song for a mix. This date is expressed as a time period (1970s, 1980s, “older”) rather than as a specific year. The intention may be to identify songs that have the ‘feel’ of that period, without necessarily actually originating then: “Basically I’m trying to make a mix that’s got the feel of a collection of lost 60’s classics, but is actually composed entirely of songs from the past 20 years or so.”

Over half of the requests (64) include at least one example of a song that could or should be included in the mix. A further 10 requests give examples of artists, rather than specific songs. These examples are intended to be interpreted in the light of the description of the mix theme—which explain what features of these songs are significant to the mix. Music similarity algorithms may be

useful in suggesting ‘more songs like these’, particularly if the system interface allows the user to specify a weighting for similarity features. Existing similarity approaches include collaborative filtering (e.g., a variant of CF based on requests to an Internet radio station [10]) and metadata-based approaches (using, for example, the metadata available in the All Music Guide database [16]).

### 4.3 The Mix Creation Process

The creation of a mix can be precipitated in many ways: the desire to give someone a special gift, an upcoming event that requires background music, a wish to listen to songs reflecting a mood, or even simply because there are “a few songs that I feel just **need** to be together” (zaxxon25) because “I think [they] would segue together really well” (concubine). A clear idea of the organizing principle is crucial. DJ Usurp also suggests picking a ‘general sound’ for the mix—“something like ‘loud/feedbacky’ or ‘sad’ or ‘piano’ or something”. It will be easier to create a ‘listenable’ mix if the possibility of grating transitions is reduced by selecting candidate songs with a similar ‘sound’, broadly construed.

At this point, usually one or more songs pop into the head of the mix creator as possibilities for inclusion in the mix. These songs can serve as anchors, around which the rest of the playlist is organized. The creator identifies more candidate songs by browsing his/her personal collection. If the mix is intended as a gift, then if possible that person’s collection should be browsed as well, “...for two reasons: a) no redundancies (if possible) and b) to get a feel for what they dig.” (DJ Usurp). More rarely, the creator might search an online database, either looking for specific songs that don’t happen to be in their personal collection, or trying out new songs: “I usually download a bunch of songs, some I’ve heard before and some I haven’t” (Shiloh). At this point, the creator is trying to open up creative avenues to explore: “My key to a great mix is overpicking ... I always pick twice as much music as I need to fill the 80/90 minutes, then force myself to start winnowing things down” (zaxxon25).

The candidates are then arranged, rearranged, and mulled over until a satisfactory playlist emerges. This process can take varying lengths of time: “anywhere from an hour to a week” (bezoomny); “I usually spend several weeks or sometimes months playing songs over in my head and trying to figure out how to link A to B to C” (Mesh). The playlist might be manipulated as a paper list: “I end up with a couple of sheets filled with song titles, arrows, comments like “fade this in halfway through...awesome!” and lots and lots of crossings out”; (Concubine); or pulled together on a PC or portable mp3 player: “right now I have a 90 minute mix on mp3 that I’ve been listening to for a week, trying to get it down to 80” (zaxxon25).

### 4.4 Mix Song Order

For mix CDs, song order is usually significant. Newbie requests for an explanation of the rules for good ordering elicited responses to the effect that “It’s been said that there’s only one rule... There are no rules” (FLWB). This type of statement was then followed up with a set of loose suggestions: that there be no more than two songs from the same artist or genre in a row, unless there is a ‘special link’ between the songs (no borders); consecutive songs should have complementary styles or sounds so that the mix does “not clash one song up against another” (FLWB); the first song should be good, but not the best on the CD: “[good] enough to be like an introduction to the tape, and will make the listener stay and hear the who [sic] thing out, but not so good that they turn it off after they get what they want in the first song” (bezoomy); particular care should be taken in selecting the final song, as it “has to leave a pleasant memory...they’ll remember the last song easily, if it’s good” (bezoomy). But the Art of the Mix contributors remind us that rules are made to be broken: for example, “sometimes an abrupt change-up can be like an alarm clock going off in a mix tooo and that’s not necessarily a bad thing” (FLWA). Some creators even smooth over song transitions by crafting segues, crossfades, or special effects with music manipulation software (John Olson).

Participant B (interviews) sums up her song ordering technique as trying to avoid boring repetition and excessive change:

I try to make the playlists so that there’s not too many slow songs, hard rock, sad songs together. I try to mix them up a little but not so much it sound random. A couple of upbeat ones, then a slower one, then a fast but maybe sad one, then a real hard rock one, then some slower ones again...I try to make it not too samey but not so random it’s completely un-listenable. Making a playlist is more of an art than a science.

### 4.5 Mix Length

The length of a mix—the number of songs included, and the time in minutes—is usually tied to the physical recording medium. The original mix cassette tapes have been superseded by mix CDs (with a brief foray into mix 8-tracks in the 1980s). Tapes were more complicated to manage, as the two sides of the tape were essentially mini-mixes and had to have an internal coherency as well as supporting a sense of ‘flow’ from side A to side B. The goal is to avoid wasting space on the tape or CD by coming as close as possible to filling it, without cropping any song. Although the occasional mix is considerably longer or shorter than what would fit on a CD—and remember, there are no rules in mix construction—the majority of mixes discussed in the Art of the Mix Forum queries conform to this convention.

## 4.6 Mix Covers

A formal mix often is accompanied by a CD cover design. Some mix creators consider the cover art “an intrinsic [sic] art of a mix” (yohan luxbroden), a final step in the process of crafting a mix. A good cover reflects the theme of the mix or the style of the songs. The cover might include images associated with the artists featured in the mix, but only if the artist is the principal organizing theme for the mix.

The cover is particularly important for mix CDs intended as gifts—and 36 of the mix requests (31.3%) were intended to be given as presents. A gift must be both tangible and attractive—where a personal playlist or mix can be used or shared on an mp3 player, a gift should be burned to CD and have a proper front and back cover. The back usually lists the songs on the CD, and probably the artists as well, but generally “not the lengths and so on” (Participant D). While no one reported creating full liner notes, it seems likely that givers would be more inclined to include them if those details were easily accessible. If the mix CD focuses on one, two, or three artists, then the cover might simply include their photos or logos. Mix CDs with a more complex theme require more creativity to express “whatever undertone you’re trying to convey with the music” (yohan luxbroden). For example, Participant B created a cover collage for a gift mix that described shared experiences with her friend: “there was cookies, cups of teas, the whole INXS rock star phenomenon, photos of some jewelry I made for her, Brian Mulco became a standing joke I don’t know how.”

Currently Google Images is a common source for digital images [5], and indeed Google Images is mentioned as the source for cover images in the interviews and on the Forums. Other sources include sites with copyright free images, stick figures custom-drawn from requests submitted to [www.explodingdog.com](http://www.explodingdog.com), and of course one could “just go out and snap some pictures with a camera” (yohan luxbroden). Less frequently, covers might be decorated with other physical media:

I have used all kinds of art supplies from crayons to markers to glittery glue to sequins to felt for decorate [sic] a mix cd's packaging and liner notes. I once did a fall mix which included Autumn Sweater by Yo La Tengo and I titled the mix The Autumn Sweater Mix and drew a little stick figure on the cover and cut out a piece of fuzzy sweater material from some scrap fabric I had and cut it into a sweater shape and glued that onto the stick figure guy. [dchipster]

## 5. Discussion and Conclusions

Creating a playlist or mix can be fun—the creator engages with their personal collection, browsing through it, sorting and ordering the songs, viewing the songs in light of a new idea (the organizing principle of the mix). From the point of view of software support, applications with more

interactive browsing facilities and more extensive browsing structures would both make it easier to locate candidate songs and add to the individual’s pleasure of possession of the personal collection. The general wisdom for information retrieval system design is that users wish to achieve their information goals efficiently and with a minimum of interaction with the system [12]; with one’s personal collection, the interaction may be more enjoyable if it can also include exploration and review while still maintaining a sense of purpose.

Creating a playlist or a mix often begins with a linear search of one’s personal collection, or perhaps of a subset of the collection such as a folder dedicated to a particular genre, artist, or ‘Recent favorites’. Within these categories, usually the songs are ordered simply by filename or song title. When scanning the list, the creator must imagine how each song might fit the theme of the mix or list: is the song of the same or a compatible genre as others already in the list? Do the lyrics fit with the message or story? Is the emotional tenor of the song in keeping with the mix/list theme? Is the tempo appropriate? The simple browsing structures and limited visible metadata for most music collection management software are too impoverished to provide support for these decisions—the creator must recall, for each song browsed, a host of details relevant to the selection decision. Again, for a software application designed to assist someone in creating a playlist, richer browsing structures and more extensive search facilities are indicated, to aid in developing a shortlist of candidate songs. Additional metadata for individual songs should be easily accessible—for example, the lyrics are particularly useful in determining whether a given song conveys the precise shade of meaning required.

Creating a formal mix CD can require significant experimentation in song selection and ordering. Tools to annotate intermediate efforts would be welcomed by mix aficionados, who currently must rely on paper notes, digital notes created outside the music collection software, or their own memories. Collection visualization and interaction software such as the Artist Map [9], PlaySom [6] or Musicream [8] are promising; Musicream is particularly appealing because it includes features to support rearranging groups of songs.

Twelve (10.4%) of the mix help requests posted to Art of the Forum included negative constraints on the mix songs—that is, information about what they did not wish to include in the mix. These details included limits on the tempo (“preferably no terribly sloooww songs”), message (“no bitchy ‘I hate the world!’ bullshit”), artist (“As long as it is not Kid Rock, I’m game”), genre (“i wanted non-nashville sound type ‘country’ music”), mood (“no serious songs”), orchestration (“trying to stay away from acoustic guitar”), specific songs (for an Anti-Valentine’s Day mix, “First person to say ‘Love Stinks’ is placed on ignore”)—essentially, the same range of music features identified in this study that have been referenced above in a positive

capacity. Few current music retrieval systems offer a Boolean NOT feature for queries, or allow users to apply a NOT to filter entries in a browsing structure, yet this would be useful for fulfilling an important category of the posted mix help requests.

Creators of personal use playlists noted shortcomings in the interfaces to support playlist development, particularly on mobile mp3 players. It can be awkward to remove a song from a playlist: “One thing that irritates me about on the go: you can’t delete a song if you put it in there by mistake; you can delete an entire playlist but not an individual song. It annoys me because there’s one song I thought was another song and I can’t get rid of it [without deleting the entire playlist and starting again] (Participant B).

Earlier music retrieval work regarding playlists has focused on ‘automatic playlist generation’ (e.g., [1], [2], [11]), and to a lesser extent on supporting users in more easily constructing their own playlists [14]. The structures of the automatically generated playlists sit indecisively between the two types of lists identified in this paper—the informal personal use playlists and the formally organized mixes. Systems to automatically generate playlists may allow users to specify the length of a mix (e.g., 12 songs and 76 minutes [2]) and define an ordering for songs, but have the much more loosely defined theme of a personal use playlist (e.g., similarity to one or more seed (example) songs [11]). Perhaps the automatic playlist generation techniques should be relaxed to provide support for users in creating and listening to their personal use playlists: for example, music similarity techniques could be used to suggest, rather than automatically select candidate songs similar to a few user-specified seeds; the user could specify a desired length for the playlist, so that the list could be more closely tailored to the circumstances under which it is used; and song ordering constraints could provide an improved shuffle facility.

This last point deserves further discussion. Proposed ordering constraints are intended to avoid abrupt transitions between songs by selecting consecutive songs that are closely related, for example by genre [2] or mood [11]; a list should have a sense of progression, for example with the songs increasing tempo or having a brighter mood [2]; and avoiding ‘same-ness’ by ensuring that there are limits on consecutive songs by the same artist [15]. A fixed ordering, however, is quickly perceived as boring for playlists that see frequent use, while a random shuffle may produce the occasion infelicity in song ordering. Both problems might be overcome by using shuffle to randomize the songs, and then a probabilistic application of the ordering constraints to make minor smoothing adjustments.

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